



NQF Level: 1

US No: 7447

# Facilitator Guide

Primary Agriculture

## Working With Numbers in Various Contexts

1234567890

Facilitator: .....

Company: .....

Commodity: ..... Date: .....

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agriculture

Department:  
Agriculture  
REPUBLIC OF SOUTH AFRICA



# Before you get started...

Dear Facilitator,

This Facilitator Guide (together with the relevant Learner Guide) is aimed at facilitators who will be assisting learners wishing to complete the following unit standard:

<b>Title:</b> Working with numbers in various contexts	<b>NQF Level:</b> 1	<b>Credits:</b> 6
<b>US No:</b> 7447		

This guide contains all necessary facilitation instructions to ensure that learners will attain the expected competencies required by the above-mentioned unit standard. This guide is designed to be used during the presentation of a learning session based on this unit standard. The full unit standard is attached at the end of this guide as well as at the end of the relevant Learner Guide. Learners are advised to read the unit standard at their time. Please discuss the unit standard with the learners to ensure that they understand what is expected from them to achieve the outcomes of the unit standard.

This unit standard is one of the building blocks in the qualifications listed below. Please mark the qualification you are currently facilitating, because that will be determined by the context of application:

Title	ID Number	NQF Level	Credits	Mark
National Certificate in Animal Production	48970	1	120	
National Certificate in Mixed Farming Systems	48971	1	120	
National Certificate in Pant Production	48972	1	120	

Please mark the learning program the learners are enrolled in:

Are you facilitating at:	Yes	No
Learnership?	<input type="checkbox"/>	<input type="checkbox"/>
Skills Program?	<input type="checkbox"/>	<input type="checkbox"/>
Short Course?	<input type="checkbox"/>	<input type="checkbox"/>

**Note to Facilitator:**  
If you are presenting this module as part of a full qualification or learnership, please ensure that you have familiarised yourself with the content of the qualification.

Please explain the above concepts to the learner.

There are four guides, namely the Learner Guide, the Learner Workbook, the Assessor Guide and the Facilitator Guide.

These guides have been developed to address specific aspects of the learning experience. You therefore need to use these guides complementally to one another.

**Make this an enjoyable learning experience!**

## Context of Application ...

Primary Agriculture is a diverse sector and a wide range of commodities is being produced for both national and international market. Each commodity has its own production requirements and practices. You will be facilitating the learning process within a specific context where a specific agricultural commodity is being produced. The learning material has been written in a **generic** manner, as it is aimed to be available on national level and should be relevant to be applied within a variety of commodities. It is therefore inclusive of all agricultural commodities and crop in this field. Therefore, the examples that are being used in the materials may not always be applicable to your specific community, commodity, environment or region.

This presents you, the facilitator, with the challenge to **contextualise** the learning material. It is imperative that you, the Facilitator and Assessor interpret and present activities, case studies and projects related to the material in such a way that learners can easily identify and apply their knowledge within their own context. This will require from you to add examples of crop, which are applicable to the community or farm. Learners must be guided with examples from their own communities, commodities, environment or regions. This should be done by complementing the learning material with:

- Examples relevant to the commodity,
- Including commodity specific requirements,
- Including operating procedures of the farm,
- Including agricultural practice specific requirements,
- Agricultural markets,
- Guiding learners to write these specific requirements down in the learning guide, etc.

**The contextualisation of the learning material is a very important step in preparing for and facilitating the learning experience and enough time and effort should be put into this exercise.**

According to the qualifications mentioned on page 2, this module could be contextualised to fit the following groups of commodities:

Plant Production	Animal Production	
<ul style="list-style-type: none"> <li>• Organic production,</li> <li>• Hydroponic production,</li> <li>• Perma-culture production,</li> <li>• Agronomy,</li> <li>• Horticulture,</li> <li>• Natural resources harvesting.</li> </ul>	<ul style="list-style-type: none"> <li>• Small stock production,</li> <li>• Large stock production,</li> <li>• Dairy production,</li> <li>• Pig production,</li> <li>• Poultry production,</li> <li>• Game,</li> <li>• Aqua / mari culture,</li> <li>• Commercial insects</li> <li>• Animal fibres harvesting,</li> <li>• Bee keeping,</li> </ul>	<ul style="list-style-type: none"> <li>• Natural resources harvesting,</li> <li>• Organic production,</li> <li>• Perma-culture production,</li> <li>• Eco/Agri Tourism,</li> <li>• Agro Chemicals,</li> <li>• Horse Breeding,</li> <li>• Etc.</li> </ul>

## How to use this guide ...

Throughout the guide information is given specifically aimed at you, the facilitator, to **assist** in the actual presentation of the learning material and/or facilitation of the learning process. Although this guide contains all the information required for attaining competency in this unit standard, references to additional resources, both printed and electronic, are provided for additional reference by the facilitator and further study by the learner.

Please note that the purpose of this information is merely to **guide** you, the facilitator, and is provided as a suggestion of possibilities. It remains the responsibility of every facilitator to re-assess the learner/s in each learning situation throughout the learning process in order to stay in touch with their specific learning needs. This should be the determining factor in the choice of the learning approach to follow.

Use the different boxes listed below for identification purposes:



Instructions regarding **activities**, whether group or individual activities, will be described in this box.



Facilitators' Tip ...

### My Notes ...

You can use this box for your own notes/comments.

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# What & How will you be Facilitating?

<b>The Learning Experience ...</b>	<b>6</b>
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LG p8: Our own; Egyptian; Roman; Different number base systems.	
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LG p18: Development and significance of zero; Place value of numbers; Patterned nature of whole numbers; the decimal number system.	
<b>Session 3: Rational and Whole Numbers and Integers</b>	<b>14</b>
LG p28: Different types of numbers; The properties of whole numbers, rational numbers and integers; The difference between rational and whole numbers; The increasing density of each type of numbers; Whole numbers as a subset of rational numbers.	
<b>Session 4: Mathematical Symbols and Numerical Models</b>	<b>15</b>
LG p32: Mathematical sentences; some everyday problems; Explore some numerical models (equations, expressions and terms); Apply numerical models (meaning of and relationships between symbols).	
<b>Session 5: Solve Everyday Problems Using Estimation &amp; Calculations</b>	<b>17</b>
LG p35: Mathematical and number problem solving strategies; Apply problem solving strategies correctly; Estimate first; Importantance calculate accurately; Calculation must follow some form of logical reasoning process; Check our solutions.	
<b>Session 6: Solutions Within Different Contexts</b>	<b>19</b>
LG p41: Check and verify our own solutions and that of others; explaining the reasoning process clearly; justifying solutions in terms of the context; Solutions are shown to be consistent with estimations and <i>vice versa</i> .	
<b>Session 7: Simple and Complex Numerical Expressions</b>	<b>20</b>
LG p44: The conventions governing the order of operations; Four basic operations in all combinations; Number operations without a calculator; Calculate expressions involving exponents without a calculator; Perform number operations with a calculator; Check that your solutions are correct.	
<b>What will I do differently next time?</b>	<b>24</b>
<b>Excerpt: SAQA Unit Standard 7447</b>	

## The Learning Experience...

**When learners have achieved this unit standard, they will be able to -**

- ◆ Express and interpret a range of contexts using mathematical symbols, and find applications for numerical models;
- ◆ Solve a range of everyday problems using estimation and calculations;
- ◆ Verify and justify solutions within different contexts;
- ◆ Perform operations on simple and complex numerical expressions;
- ◆ Describe and compare counting systems from different cultures;
- ◆ Critically analyse the development of the base ten number system;
- ◆ Apply the relationship between rational and whole numbers;
- ◆ Apply the relationship between rational numbers and integers.

## Learning Assumed to be in Place

The following competencies at ABET level 3 Numeracy are assumed to be in place:

- ◆ Solve realistic and abstract problems involving changing quantities by addition, subtraction, multiplication and division;
- ◆ Solve realistic and abstract problems involving variables in non-symbolic form;
- ◆ Demonstrate knowledge of different ways of expressing fractions and work with fractions, percentages and decimals to describe situations and calculate change situations;
- ◆ Demonstrate knowledge of the development of mathematics as a human activity and use alternate number system to the base ten system.



Remember to do a diagnostic assessment of the learner's prior learning and ensure that they are starting at the correct level.

## Tips for Level of Learning



Remember the following before you get started:

***This unit standard is aimed at level 1 learners.***

- ◆ A typical level 1 learner might be exposed to the world of work through this learning program for the first time.
- ◆ Explain concepts and define words in a simple, clear and concise method throughout the learning program to help the learner where possible.
- ◆ Take special care to facilitate for ALL learners. Allow them opportunities to share experiences, prior knowledge, translate into their mother tongue for each other and enjoy the learning process.
- ◆ The examples given in this resource guide might be for a different geographical area or commodity to what the learner is exposed to – please adapt your examples accordingly.

# Learning Program Time Frames

	Total time allocated (hours)	Theoretical learning time allocated (hours)	Practical learning time allocated (hours)	Activities to be completed
<b>Complete Program (including summative assessment)</b>	36	1140 minutes (19 hours)	960 minutes (16 hours)	12
<b>Learner Orientation and "Ice Breaker"</b>	0.5 (30 minutes)	0.25 (15 minutes)	0.25 (15 minutes)	N/a
<b>Purpose, Introduction and Learner Directions</b>	1.5 hour (90 minutes)	0.75 (45 minutes)	0.75 (45 minutes)	Class exercise
<b>Session 1</b>	3 hours (180 minutes)	2 hours (120 minutes)	60 minutes (1 hour)	1.1 – 1.2
<b>Session 2</b>	3 hours (180 minutes)	2 hours (120 minutes)	60 minutes (1 hour)	2.1 – 2.3
<b>Session 3</b>	6 hours (360 minutes)	3 hours (180 minutes)	180 minutes (3 hours)	-
<b>Session 4</b>	6 hours (360 minutes)	3 hours (180 minutes)	180 minutes (3 hours)	4.1
<b>Session 5</b>	6 hours (360 minutes)	3 hours (180 minutes)	180 minutes (3 hours)	5.1 – 5.2
<b>Session 6</b>	6 hours (360 minutes)	3 hours (180 minutes)	180 minutes (3 hours)	-
<b>Session 7</b>	3 hours (180 minutes)	2 hours (120 minutes)	60 minutes (1 hour)	7.7 – 7.3
<b>Preparation for Assessment &amp; revision</b>	1 hour	-	-	N/a

## Why is it Important to be Competent in Numeracy and Literate in Mathematics?



### Before you continue ...

- ◆ Please allow learners to complete the Activity in their Learning Guides to be found on pages 4 to 6.
- ◆ This is an individual as well as a group activity.
- ◆ Make sure to use the opportunity of helping the learners to dispel their dreads about doing mathematics!



This section helps the learner to understand the importance of numeracy and mathematics in their daily lives and will help to build learner confidence for this subject.

# Facilitator's Checklist & Training Aids

## Learner support strategies:

Learners are supplied with all resources and aids as required by the programme – including:

- Objects & devices such as equipment, protective clothing, safety gear, etc.
- Learner Guides and Learner Workbook
- Visual aids, etc.

Use this checklist below during your preparation to ensure that you have all the equipment, documents and training aids for a successful session.

Preparation:	Yes	No
<b>Qualification Knowledge</b> – I have familiarised myself with the content of the applicable qualification		
<b>Unit Standard Knowledge</b> – I have familiarised myself with the content of all aspects of the applicable unit standard		
<b>Content Knowledge</b> – I have sufficient knowledge of the content to enable me to facilitate with ease		
<b>Application knowledge</b> – I understand the programme matrix & have prepared for programme delivery accordingly		
<b>Contextualisation</b> – I have included information which is specific to the commodity and practices related to the commodity		
<b>Ability to respond to learners background &amp; experience</b> – I have studied the learner demographics, age group, experience & circumstances & prepared for programme delivery accordingly		
<b>Enthusiasm &amp; Commitment</b> – I am passionate about my subject & have prepared my programme delivery to create a motivating environment with real commitment to success		
<b>Enterprise knowledge</b> – I know & understand the values, ethics, vision & mission of the workplace & have prepared my programme delivery, reporting & administrative tasks accordingly.		
Equipment check:		
Learner guides x 1 per learner		
Assessment guides x 1 per learner		
Writing materials & stationary (facilitator & learner)		
White board & pens		
Flip chart paper		
Proxima projector & screen		
Laptop & programme disk		
Sample Hand-outs and examples of laws and other relevant documents		
Safety gear as prescribed by unit standard and applicable legislation		



Documentation checklist:		
Attendance Register		
Course Evaluation		
Learner Course Evaluation		
Portfolios of evidence		

## Contextualisation of Content!

Go through this module and indicate what specific **information** / **activities** / **examples** should be included in this module?

Contextualisation	
<ul style="list-style-type: none"> <li>Commodity specific?</li> </ul>	
<ul style="list-style-type: none"> <li>Operating procedures of the farm?</li> </ul>	
<ul style="list-style-type: none"> <li>Agricultural practices?</li> </ul>	
<ul style="list-style-type: none"> <li>Agricultural markets?</li> </ul>	

Session

# 1 Counting Systems From Different Cultures

**Learner Guide:**  
**Page 8**

*After completing this session, the learner will be able to:*

**(SO 5) Describe and compare counting systems from different cultures.**

Concept (SO 5)	Time frame	Activities related to the concept
<b>AC 1:</b> Numbers are translated from one base system to another. <b>Range:</b> Base 2, 5, 10, and 16.	45 minutes	Activity 1.2
<b>AC 2:</b> Descriptions show understanding of how counting systems developed and their significance.	45 minutes	Activity 1.1
<b>AC 3:</b> Descriptions show examples of how the systems might have been used, and the limitations of the system.		



**Paragraphs 1.1 – 1.4:**

- ◆ Ensure that you orientate learners as to what they are going to learn and why this is important.
- ◆ This section includes the “History of Mathematics and number systems”.
- ◆ It is very important, even though it appears to be quite theoretical, because it will help the learners to understand the reason for numbers and mathematics.
- ◆ It will also show learners that people have been using mathematics and numbers in their daily lives for millennia.

**Paragraph 1.5:**

- ◆ This is a difficult concept for most level 1 learners and should be handled with care and extra attention. Spend a little bit of extra time on this.
- ◆ Ensure that you make this as interesting as possible.
- ◆ Tell learners that binary code and hexadecimal systems are used in technology such as computers.
- ◆ Let different learner groups read about different base systems and give a peer group presentation.

**Assessment (“How am I doing”):**

- ◆ It is important to prompt learners to check their progress by completing this self-assessment exercise.
- ◆ Please offer learners an opportunity to ask questions and share concerns.

**Please allow learners to complete Activities 1.1 and 1.2 in their workbooks**



Type of activity	Resources	Instructions to give to the learners	Conclusions
<b>1.1:</b> Class Exercise Groupwork Research	Learner Workbook Learner Guide Oral instruction Library / Internet	As per Learner Guide as well as 'Hints' above. Assist learners to have access to resources	Learners must demonstrate abilities as indicated in the above-mentioned assessment criteria (AC 2 & 3)
<b>1.2:</b> Individual Exercise	Learner Workbook Learner Guide Oral instruction	As per Learner Guide as well as 'Hints' above.	Learners must demonstrate abilities as indicated in the above-mentioned assessment criteria (AC 1)

### My Notes ...

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# Session 2 Development of the Base-ten Number System

Learner Guide:  
Page 18

After completing this session, the learner will be able to:  
**(SO 6) Critically analyse the development of the base-ten number system.**

Concept (SO 6)	Time frame	Activities related to the concept
<p><b>AC 1:</b> The development and significance of zero is explained.</p>	90 minutes	Activities 2.1 – 2.3
<p><b>AC 2:</b> Understanding of the place value of numbers is demonstrated. <b>Range:</b> Expansion of numbers in different ways, the value of a numerical symbol in a number.</p>		
<p><b>AC 3:</b> The patterned nature of whole numbers and its historical development are described.</p>		
<p><b>AC 4:</b> The contestations around, and use and popularisation of the decimal number system are described. <b>Range:</b> Uses in economics and politics.</p>		



- ◆ Ensure that you orientate the learner as to what they are going to learn and why this is important.
  - ◆ This section includes the concepts regarding the decimal system, and the use of zero and a placeholder.
  - ◆ It is very important, even though it appears to be quite theoretical, because it will help the learners to understand that these are some of the corner stones of mathematics.
  - ◆ This section contains difficult concepts for most level 1 learners and should be handled with care and extra attention.
  - ◆ Spend a little bit of extra time on this
  - ◆ Allow learner to practice as many examples as you can find.
  - ◆ Allow learners an opportunity to discuss and, share and show each other. Peer learning often works better to facilitate understanding of this concept.
- Assessment (“How am I doing”):**
- ◆ It is important to prompt learners to check their progress by completing this self-assessment exercise.
  - ◆ Please offer learners an opportunity to ask questions and share concerns.



**Please allow learners to complete Activities 2.1 – 2.3 in their workbooks**

Type of activity	Resources	Instructions to give to the learners	Conclusions
<b>2.1:</b> Individual Exercise	Learner Workbook Learner Guide Oral instruction	As per Learner Guide as well as 'Hints' above. Assist learners to have access to resources	Learners must demonstrate abilities as indicated in the above-mentioned assessment criteria (AC 1-4)
<b>2.2:</b> Individual Exercise	Learner Workbook Learner Guide Oral instruction	As per Learner Guide as well as 'Hints' above. Assist learners to have access to resources	
<b>2.3:</b> Individual Exercise	Learner Workbook Learner Guide Oral instruction	As per Learner Guide as well as 'Hints' above.	

**My Notes ...**

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Session

# 3 Rational and Whole Numbers and Integers

**Learner Guide:**  
**Page 28**

After completing this session, the learner will be able to:  
**(SO 7 and 8) Analyse the relationship between rational and whole numbers, and rational numbers and integers.**

Concept (SO 5)	Time frame	Activities related to the concept
<b>AC 1:</b> Demonstrations describe the increasing density of the system.	90 minutes	Activity 3.1
<b>AC 2:</b> Demonstrations show that whole numbers are a subset of rational numbers.		
<b>AC 3:</b> The properties of whole numbers and rational numbers are given.		



- ◆ Ensure that you orientate the learner as to what they are going to learn and why this is important.
- ◆ This section explores the concepts of different "number systems"
- ◆ It is very important, to spend sufficient time on this section to allow learners to understand the difference between different number systems and integers.
- ◆ Learners will use these types of numbers extensively into the future of their mathematical development
  
- ◆ This is a difficult concept for most level 1 learners and should be handled with care and extra attention.
- ◆ Spend a little bit of extra time on this
- ◆ Make a poster (the same or similar to the one below) per work group. Allow each group to select a group of numbers, such as rational, integers, etc. and find all the different information required about it from their learner guide.
- ◆ Let each group make a presentation to the class explaining their understanding to their peers.
- ◆ This will also allow you an opportunity to spend extra time with learners who are struggling with concepts.

**Assessment ("How am I doing"):**

- ◆ It is important to prompt learners to check their progress by completing this self-assessment exercise.
- ◆ Please offer learners an opportunity to ask questions and share concerns.

# Session 4 Mathematical Symbols and Numerical Models

**Learner Guide:**  
**Page 32**

*After completing this session, the learner will be able to:*  
**SO 1: Express and interpret a range of contexts using mathematical symbols and find applications for numerical models.**

Concept (SO 1)	Time frame	Activities related to the concept
<p><b>AC 1:</b> Mathematical sentences reflect the situation completely and accurately. <b>Range:</b> Everyday problems, numerical contexts. Numerical models include equations, expressions and terms.</p>	180 minutes	Activity 4.1
<p><b>AC 2:</b> The form of expression is appropriate to the context.</p>		
<p><b>AC 3:</b> Application for given numerical models is developed such that the meaning of symbols and relationships between them are clarified.</p>		



- ◆ Ensure that you orientate the learner as to what they are going to learn and why this is important.
- ◆ This section explores the first real concepts of mathematics and number sense.
- ◆ It is very important, to spend sufficient time on this section to allow learners to understand the methodology of "mathematical language".
- ◆ Learners will use these concepts extensively into the future of their mathematical development.
  
- ◆ **Mathematical concepts** are a difficult concept for most level 1 learners and should be handled with care and extra attention. Spend a little bit of extra time on this.
- ◆ Allow learners to complete the exercise below as group work and explore as many examples as you can possibly find of "logical thinking".
- ◆ This section is also important for the development of CCFO – Problem Solving!
- ◆ **Numerical Models:** This is a difficult concept for most level 1 learners and should be handled with care and extra attention. Spend a little bit of extra time on this.
- ◆ Ask learners to make flash cards with examples of each concept according to each definition.
- ◆ Learners should not copy definitions verbatim, but rather write down their own understanding in their own words.
- ◆ **Assessment ("How am I doing"):**
  - ◆ It is important to prompt learners to check their progress by completing this self-assessment exercise.
  - ◆ Please offer learners an opportunity to ask questions and share concerns.





# Session 5 Solve Everyday Problems Using Estimation & Calculations

Learner Guide:  
Page 35

After completing this session, the learner will be able to:

**(SO 2) Solve a range of everyday problems using estimation and calculations.**

Concept (SO 5)	Time frame	Activities related to the concept
<b>AC 1:</b> Problem-solving strategies are based on a correct interpretation of the problem situation.	180 minutes	Activity 5.1 – 5.2
<b>AC 2:</b> Estimates can be justified within context.		
<b>AC 3:</b> Calculations are performed accurately.		
<b>AC 4:</b> Calculations follow some form of logical reasoning process, which is presented clearly.		
<b>AC 5:</b> Solutions are correct in terms of the context.		



- ◆ Ensure that you orientate the learner as to what they are going to learn and why this is important.
- ◆ This section explores concepts of logic and problem solving.
- ◆ It is very important, to spend sufficient time on this section to allow learners to understand the methodology of "mathematical language".
- ◆ Learners will use these concepts extensively into the future of their mathematical development, as well as in their everyday lives!
  
- ◆ **Problem solving strategies** is a difficult concept for most level 1 learners and should be handled with care and extra attention. Spend a little bit of extra time on this.
- ◆ Find as many examples from the immediate environment that learners find themselves in, as possible.
- ◆ Allow learner ample opportunity to practice in pairs to estimate, round off and give examples of how this might be used in their job or life.
  
- ◆ **Calculation** is a difficult concept for most level 1 learners and should be handled with care and extra attention. Spend a little bit of extra time on this.
- ◆ Revise the concepts of "odd" and "even" numbers first.
- ◆ Allow learners in groups to explore the different properties, with as many examples as you can come up with.
- ◆ Allow learners to help and teach each other. Peer learning often works best to facilitate learning of the concept!

- ◆ Spend some time allowing the learner groups to brainstorm the possible consequences of **inaccurate calculations**.
- ◆ Lead them to explore consequences for their own lives (such as incorrect salaries and wages), consequences for their community (such as incorrect water bills), consequences to Agriculture in SA (such as incorrect economic indicators), etc.
- ◆ This also helps to develop CCFO – Inter-relatedness and self organisation!

**Assessment (“How am I doing”):**

- ◆ It is important to prompt learners to check their progress by completing this self-assessment exercise.
- ◆ Please offer learners an opportunity to ask questions and share concerns.



**Please allow learners to complete Activities 5.1 and 5.2 in their workbooks**

Type of activity	Resources	Instructions to give to the learners	Conclusions
<b>5.1:</b> Individual Exercise	Learner Workbook Learner Guide Oral instruction	As per Learner Guide as well as 'Hints' above. Assist learners to have access to resources	Learners must demonstrate abilities as indicated in the above-mentioned assessment criteria (AC 1 – 5)
<b>5.2:</b> Individual Exercise	Learner Workbook Learner Guide Oral instruction	As per Learner Guide as well as 'Hints' above.	

**My Notes ...**

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Session

# 6 Solutions Within Different Contexts

**Learner Guide:**  
**Page 41**

*After completing this session, the learner will be able to:*

**(SO 3) Verify and justify solutions within different contexts.**

Concept (SO 3)	Time frame	Activities related to the concept
<b>AC 1:</b> The reasoning process is explained clearly.	180 minutes	Activity 6.1
<b>AC 2:</b> Solutions are justified in terms of the context. <b>Range:</b> Appropriate and inappropriate solutions.		
<b>AC 3:</b> Solutions are shown to be consistent with estimations and <i>vice versa</i> .		



- ◆ Ensure that you orientate the learner as to what they are going to learn and why this is important.
- ◆ This section explores concepts of logic and problem solving.
- ◆ It is very important, to spend sufficient time on this section to allow learners to practice "solving problems" from their own context. Try to find at least two "sample problems" per learner group, and allow each group to complete the problem – then present to their method to the rest of the class.
- ◆ Learners will use these concepts extensively into the future of their mathematical development, as well as in their everyday lives!

**Assessment ("How am I doing"):**

- ◆ It is important to prompt learners to check their progress by completing this self-assessment exercise.
- ◆ Please offer learners an opportunity to ask questions and share concerns.

**My Notes ...**

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# Session 7 Simple and Complex Numerical Expressions

Learner Guide:  
Page 44

After completing this session, the learner will be able to:

**(SO 4) Perform operations on simple and complex numerical expressions.**

Concept (SO 4)	Time frame	Activities related to the concept
<b>AC 1:</b> Operations are performed according to the conventions governing the order of operations.	180 minutes	Activities 7.1 – 7.3 (See lesson plan below in regards to activity 7.2)
<b>AC 2:</b> Solutions are correct.		



- ◆ Ensure that you orientate the learner as to what they are going to learn and why this is important.
- ◆ This section explores verification and confirmation of solutions.
- ◆ This section builds on the last chapter and it would be a good idea to let the different learner groups swap examples and confirm and justify each other's solutions.
- ◆ Learners should also have calculators available for this section
- ◆ Learners will use these concepts extensively into the future of their mathematical development, as well as in their everyday lives!
  
- ◆ **BODMAS** is one of the most important concepts of mathematical accuracy.
- ◆ Spend extra time on this concept.
- ◆ Allow learners to explore the correct order of operations vs. the incorrect order.
- ◆ Remind learners of the consequences for that they concluded with regards incorrect calculation.
- ◆ This also helps to develop CCFO – Inter-relatedness and self organisation!
  
- ◆ Learners are often daunted by the concept of doing mathematics **without a calculator**.
- ◆ Allow each learner time individually to follow the example below. Learners should not initially help each other with this example.
- ◆ Once they learn that it can be done – learners have often crossed a major hurdle and their confidence levels for doing mathematics soars!
  
- ◆ There are great online resources available for learning these skills, which will also allow learners to become familiar with **computer technology**.
- ◆ If learners have access to the Internet, allow them an opportunity to explore the online lessons at [www.learn.org.za](http://www.learn.org.za)
- ◆ Alternatively – familiarise yourself with the exercises and talk learners through the keypad operations of a calculator.
- ◆ Remember not to make any assumptions regarding prior knowledge.
- ◆ Also remember that you might be faced with large variances in ability and skill here. Beware not to allow advanced learners to dominate the session or to intimidate slower learners.

**Assessment (“How am I doing”):**

- ◆ It is important to prompt learners to check their progress by completing this self-assessment exercise.
- ◆ Please offer learners an opportunity to ask questions and share concerns.



**Please allow learners to complete Activities 7.1 and 7.3 in their workbooks**

Type of activity	Resources	Instructions to give to the learners	Conclusions
<b>7.1:</b> Individual Exercise	Learner Workbook Learner Guide Oral instruction	As per Learner Guide as well as 'Hints' above. Assist learners to have access to resources	Learners must demonstrate abilities as indicated in the above-mentioned assessment criteria (AC 1 & 2)
<b>7.3:</b> Individual Exercise	Learner Workbook Learner Guide Oral instruction	As per Learner Guide as well as 'Hints' above.	

## Lesson Plan (Activity 7.2)

### ■ Do the following:

1. Discuss how to solve word problems involving time and money.
2. Work as a class to solve word problems focusing on addition, subtraction, multiplication, and simple fractions.
3. Work with a partner to make up his or her own word problems.

### ■ Materials Needed

The class will need an overhead projector with transparencies and pens.

### ■ Procedures to Follow

1. Begin the lesson by asking students to think about how time and money are used in their daily lives. Students may suggest the following:
  - ◆ Amount of time it takes to get to soccer practice.
  - ◆ Amount of time they are supposed to practice their musical instrument.
  - ◆ The times work starts and ends.
  - ◆ How much money they earn in their job.
  - ◆ How much money they need to save to buy a new television set.

### ■ Or something similar....

2. Explain to students that they use mathematics every time they figure out how much time or money they have, spend, or need. During this lesson, students will be working together to apply the mathematical skills they already know (addition, subtraction, multiplication, and fractions) to solve real-life problems about money and time. They will

begin by working as a class to solve word problems about money and time. After practicing, students will work with partners to apply the same writing and mathematical skills as they prepare their own word problems involving either time or money.

3. Write the following problem on the board or on an overhead transparency:

*Your teacher told you to buy a notebook, a ruler, a pencil, and an eraser for mathematical class. The notebook costs R3.00, the ruler R1.50, the pencil R0.20, and the eraser R0.40. What is the total amount of money you need to buy these items?*

Ask students how they would solve this problem. First, discuss which operation they should use. Point out that the words "the total amount" usually indicates that addition is called for.

**Go through the following steps with your students to solve this problem:**

- ◆ To find out how much money you need, add up the following:
- ◆ You would need to take R5.10 to the store to have enough money to buy the supplies.
- ◆ Ask students how they would solve the problem if the facilitator asked them to get three pencils and three erasers. Explain that when they hear the word *each*, they know that they will likely have to multiply.
- ◆ To find out how much money you would need now, begin by multiplying:
- ◆ Then add those totals to the other expenses for single items:

4. **Now work on this problem with the class:**

*Sipho has soccer practice at 3:45 p.m. If it takes one hour to drive thereby taxi, plus an additional 15 minutes during rush hour, what time does he have to leave to get there on time?*

Discuss the way to solve the problem with the class. What operation must they use? Have them identify the need to use subtraction to determine that one-hour earlier than 3:45 would be 2:45. Subtracting another 15 minutes would bring the time to 2:30. To get to practice on time, Sipho must leave at 2:30.

Ask students how they would figure out how much total time Sipho would be gone from home, including travel time to and from practice and actual practice time (which is 1 hour and 30 minutes). Tell them to try to use fractions in solving this problem.

In this case, they would need to determine that 1 hour and 15 minutes is the same as  $1\frac{1}{4}$  hours and that 1 hour and 30 minutes is the same as  $1\frac{1}{2}$  hours. Then they would add the travel time to the practice time and the travel time home:

You may want to use a circle graph like this one to illustrate this information. The quarter of the pie missing represents 15 minutes, or one-quarter of an hour.

5. **Give students one final problem to work on as a class:**

*Johnny's neighbours asked him to rake their leaves. They offered to pay him R5 an hour. How many hours must he work to earn R20?*

To solve the problem, suggest that students set up the following equation:  $R5 \times \text{number of hours} = R20$ .

You may choose to set up a table such as this one to illustrate how Johnny earns money for each hour worked.

If they know their multiplication tables, they will see that  $R5 \times 4 \text{ hours} = R20$ . If students have learned how to divide, they can divide R20 by 5 to get 4 hours.

6. Ask students if they understand how they use mathematics all the time. Have them pick partners. Then have each pair make up one word problem focusing on time or money. The problems should give students practice working on addition, subtraction, multiplication, or fractions. Have students write their problems on a piece of paper or on a transparency so they can present to the class. After they have written the problems, have them prepare their own solution in the form of an equation or equations, as well as a written explanation of the steps they used to solve the problem.

Have each pair present its problem to the class. Have the presenting pair lead a discussion about the steps needed to solve the problem. Then they can reveal their own solutions.

### ■ Discussion Questions

1. Which words in a word problem usually means that addition is the correct operation to use? Which words usually indicate that subtraction should be used?
2. Give two examples of problems about money or time that came up in your everyday life. Were you able to solve them?
3. Take one of the problems presented by your classmates and add a sentence to it that requires using another mathematical operation to find the solution. (They might ask them to figure out how much time is needed each week, if the activity was only for one day. Or, they might ask how much change they would get back for their purchase, if they gave the cashier a R20 bill for a smaller amount.)

### ■ Evaluation

Use the following three-point rubric to evaluate how well the other students listened in class, participated in class discussions, and was able to apply what they learned to write their own word problems.

- ◆ **Three points:** very attentive during class; actively participated in class discussions; and applied what they learned to write accurate, interesting word problems.
- ◆ **Two points:** somewhat attentive during class; showed some involvement during class discussions; and applied what they learned to write satisfactory word problems.
- ◆ **One point:** not attentive during class; showed little involvement during class discussions; and had difficulty applying what they learned to write their own word problems.

### ■ Extensions: Tips for Solving Problems

Divide students into groups of three or four. Based on what they learned during class, have each group write a chart of at least three tips for other students on how to solve word problems. The chart should encourage students to do the following when solving word problems:

- ◆ Read the problem very carefully.
- ◆ Point out key words that signify which operation to use.
- ◆ Discuss the importance of showing the steps involved in solving a problem.

Students can be as creative as they want in developing their posters and can use symbols, drawings, or problems to express their ideas. If time permits, have students share their posters. Then display them in the classroom.

## What will I do differently next time?

Take some time to **reflect** on your own activities as facilitator of this Unit Standard. Then write down five of the most important lessons you have learnt and include a motivation:

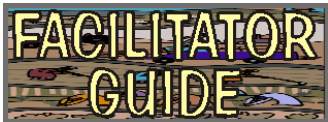
What will I do differently next time?	Motivate how or why (Give examples, reasons, etc.)
1.	
2.	
3.	
4.	
5.	

As facilitator, you have hands on experience in the application of the unit standard. And you might experience difficulties with the unit standard that the developers did not anticipate. Also, the unit standard will be revised at the end of the registration period. Your comments below can be an important contribution in the revision process and should be brought to the attention of either the AgriSETA ETQA manager or the SGB chairperson.

Please take some time to reflect on your experience and list a few of the difficulties you had to address.

Difficulties I had with the Unit Standard	Recommended Changes to Address the Difficulty
6.	
7.	
8.	
9.	
10.	





*Working with numbers in various contexts*

Primary Agriculture

NQF Level 1

Unit Standard No: 7447

**25**

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